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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/936,514	09/14/2001	Takeya Abe	018793-253	4410

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EXAMINER
FRONDA, CHRISTIAN L

ART UNIT	PAPER NUMBER
1652	

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DATE MAILED: 03/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/936,514	ABE ET AL.	
	Examiner	Art Unit	
	Christian L. Fronda	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/01, 11/01, 2/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restriction

1. The restriction requirement dated 01/11/2005 has been withdrawn in view of applicants' arguments filed 02/08/2005.

2. Claims 1-24 are pending and under consideration in this Office Action.

3. Acknowledgment is made of applicants' claim for foreign priority under 35 U.S.C. 119(a)-(d). Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

4. The disclosure is objected to because of the following informality: in the specification there is no statement that indicates that the instant application is the US National Stage filing of PCT Application No. PCT/JP01/00313, filed 01/12/2001, which claims foreign priority under 35 U.S.C. 119(a)-(d) to foreign patent application 2000-7993 filed in Japan on 01/17/2000. This should appear as the first sentence of the specification following the title, preferably as a separate paragraph unless it appears in an application data sheet. Appropriate correction is required.

5. Claim 17-24 are objected to under 37 CFR 1.75 as being a substantial duplicate of claims 5-16. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 U.S.C. § 112, 2nd Paragraph

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-24 rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are steps for contacting a nitrile compound with the microorganism or nitrile hydratase and collecting or isolating the produced corresponding amide.

8. Claims 1-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, the phrase "characterized by making" renders the claim vague and indefinite because it is not clear if the claim is actually directed toward a process comprising process steps or a product amide-containing solution. Claims 2-24 which depend from claim 1 are also rejected because they do not correct the defect of claim 1.

Claim Rejections - 35 U.S.C. § 112, 1st Paragraph

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 1-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claims are genus claims that are directed toward any process for preparing any amide-containing solution using any microorganism fungus body containing any nitrile hydratase of any amino acid sequence and structure. The scope of the claims includes many microorganisms and many nitrile hydratase enzymes with widely differing structural, chemical, and physical characteristics. Furthermore, the genus is highly variable because a significant number of structural differences between genus members exits.

The specification discloses a MT-10827 (FERM BP-5785) which is not a not a fungus, but is instead an *E.coli* host cell transformed with a plasmid containing a polynucleotide encoding a

bacterial nitrile hydratase from *Pseudonocardia thermophila* JCM3095 (see US Patent 5,910,4352), and its use in converting acylonitirle to its corresponding amide acylamide. However, the specification does not provide an amino acid sequence of the said bacterial nitrile hydratase from *Pseudonocardia thermophila* JCM3095, and fails to provide a written description of additional nitrile hydratase enzymes and microorganisms as encompassed by the claimed genus. Neither the specification nor the general knowledge of those skilled in the art provide evidence of any significant structure which would be expected to be common to the members of the genus.

In view of the above considerations, one of skill in the art would not recognize that applicant was in possession of the necessary common features or attributes possessed by members of the claimed genus. Accordingly, Applicant has failed to sufficiently describe the claimed invention, in such full, clear, concise, and exact terms that a skilled artisan would recognize Applicant was in possession of the claimed invention.

Claim Rejections - 35 U.S.C. § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oriel et al. (WO 99/55719) in view of Chen. (J Biol Chem. 1967 Jan 25;242(2):173-81). The Oriel et al. reference has been attached to the previous Office Action.

Oriel et al. teach a process where BR449 cells are contacted with acrylonitrile to produce a solution containing acrylamide, the said BR449 cells are separated from the reaction mixture, the said acrylamide solution is treated with activated charcoal (an activated carbon), to remove contaminants and the acrylamide is concentrated or precipitated by distillation or evaporation under reduced pressure (see entire publication especially p. 17, line 17 to p.18, line 24). Oriel et al.further teach that other unsaturated aliphatic nitrile compounds such as crotononitrile and methacrylonitrile that can be converted using the nitrile hydratase of BR449 (see p. 36, lines 27-

28).

The teachings of Oriel et al. differ from claims 1-4 in that the amide compound-containing solution is contacted with activated charcoal under acidic conditions.

Chen teach process steps for removing lipid impurities by acid-charcoal treatment, using an acidic range of pH 3 to pH 7 at 2°C where the charcoal is made from wood (see entire publication, especially Figs. 1-4 and pp. 174-177)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Oriel et al. such that the amide solution is subjected to acid-charcoal treatment as taught by Chen. One of ordinary skill in the art at the time the invention was made would have been motivated to do this for the purposes of having a simple and beneficial purification process that produces an amide compound and removes impurities including lipid impurities.

No patentable weight is given to the preamble of the process claims since it merely recites the purpose of these process claims. Because the process steps of the modified process of Oriel et al. stated above are the same as the process steps of claims 1-4, then the modified process of Oriel et al. stated above would inherently produce the amide compounds recited in claims 3 and 4.

13. Claims 5, 7, 9, 17, 19-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oriel et al. in view of Chen as applied to claims 1-4 above, and further in view of Rezende et al. (J Gen Appl Microbiol. 1999 Aug;45(4):185-192).

The teachings of Oriel et al. and Chen have been stated above.

Rezende et al. teach yeast strains that grew on acetonitrile, isobutyronitrile, methacrylnitrile (an unsaturated nitrile), and propionitrile, where said yeast strains utilize nitriles by a two-step reaction mediated by both inducible and intracellular nitrile hydratase and amidase (see entire publication, especially Table 3 and pp. 186-191).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the modified process of Oriel et al. stated above such that yeast strains taught by Rezende et al. or purified fractions of the said yeast strains that contain nitrile hydratase are substituted for the BR449 cells taught by Oriel et al. to thereby make the claimed purification

process of an amide compound recited in claims 5, 7, 17, 19, and 22. One of ordinary skill in the art at the time the invention was made would have been motivated to do this for the purpose of having a simple and beneficial purification process that produces an amide compound.

No patentable weight is given to the preamble of the process claims since it merely recites the purpose of these process claims. Because the process steps of the further modified process of Oriel et al. stated above are the same as the process steps of claims 5, 7, 17, 19, and 22, then the further modified process of Oriel et al. stated above would inherently produce the acylamide or methacylamide recited in claim 9.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use organic acids of acrylic acid or methacrylic acid recited in claims 20 and 21 for the purpose of maintaining the desired pH of the solution (pH 3.5- pH 6.5) from which the amide compound is prepared since the acid dissociation exponent known in the art of acrylic acid is 4.25 and methacrylic acid is 4.66.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to maintain a temperature from 10 to 50°C as recited in claim 23 for the purpose of optimizing the removal of impurities from the produced amide containing solution.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the liquid obtained by separating the activated charcoal at saturation temperature or lower as recited in claim 24 for the purpose of optimizing precipitation and crystallization of the produced amide.

14. Claims 6, 8, 10-16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. (US Patent 5,910,432) in view of Rezende et al. (J Gen Appl Microbiol. 1999 Aug;45(4):185-192) and Chen. (J Biol Chem. 1967 Jan 25;242(2):173-81).

Ito et al. teach a process for making the corresponding amide compound from a nitrile compound comprising contacting a bacterial transformant that expresses a nitrile hydratase gene with a desired nitrile compound (see entire patent, especially column 5, line 51 to column 6, line 21).

The teachings of Rezende et al. and Chen have been stated above.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Ito et al. such that the gene encoding nitrile hydratase from the yeast strains taught by Rezende et al. is isolated from the said yeast strains and are inserted into

the bacterial transformant taught by Ito et al. to thereby make the claimed purification process of an amide compound recited in claims 6, 8, 11, and 14. One of ordinary skill in the art at the time the invention was made would have been motivated to do this for the purposes of having a simple and beneficial purification process that produces an amide compound using a recombinant host cell containing a yeast gene encoding nitrile hydratase.

No patentable weight is given to the preamble of the process claims since it merely recites the purpose of these process claims. Because the process steps of the modified process of Ito et al. stated above are the same as the process steps of claims 6, 8, 11, and 14, then the further modified process of Ito et al. stated above would inherently produce the acylamide or methacylamide recited in claim 10.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use organic acids of acrylic acid or methacrylic acid recited in claims 12 and 13 for the purpose of maintaining the desired pH of the solution (pH 3.5- pH 6.5) from which the amide compound is prepared since the acid dissociation exponent known in the art of acrylic acid is 4.25 and methacrylic acid is 4.66.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to maintain a temperature from 10 to 50°C as recited in claim 15 for the purpose of optimizing the removal of impurities from the produced amide containing solution.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the liquid obtained by separating the activated charcoal at saturation temperature or lower as recited in claim 16 for the purpose of optimizing precipitation and crystallization of the produced amide.

Conclusion

15. No claims are allowed.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian L Fronda whose telephone number is (571)272-0929. The examiner can normally be reached Monday-Friday between 9:00AM - 5:00PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathapura N Achutamurthy can be reached on (571)272-0928. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

17. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLF

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